

REMARKS

Applicants would like to thank the Examiner, Ms. Angela Martin, for the courteous and helpful telephone interview extended to applicants' undersigned representative on July 19, 2006. The substance of the interview is explained below.

Claims 1-15 are rejected in the action under 35 U.S.C. 103(a) as being unpatentable over Fujimoto et al. (U.S. Patent No. 6,887,623 B2) (hereinafter: "Fujimoto") in view of Fukui et al. (EP 1,335,438 A1) (hereinafter: "Fukui").

The Office's position appears to be that Fujimoto discloses a negative electrode for a rechargeable lithium battery and a method for fabricating the electrode which meets all of the limitations of claims 1 and 12 of the present application except that Fujimoto does not teach the use of a binder in forming the electrode active material layer.

However, Fujimoto does not disclose a negative electrode for a rechargeable lithium battery and a method for fabricating the electrode which meets the limitations of claims 1 and 12. Claims 1 and 12 require the sintering of an anode mix layer containing a binder and particles of an active material containing silicon and/or a silicon alloy. Fujimoto discloses providing a thin film

of active material on the current collector by vapor phase deposition or by plating.

The telephone interview on July 19, 2006, was conducted in order to clarify the Examiner's interpretation of the disclosure of Fujimoto. Applicants' undersigned representative understood from the interview that the Examiner believed that the "particles" referred to in Col. 2, lines 59-67, which describes providing the thin film by "depositing metal particles on a surface-roughened metal foil to provide a metal foil as a current collector and subsequently depositing the thin film...", to be particles of the active material.

During the interview, applicants' undersigned representative explained that the "particles" referred to in Col. 2, lines 59-67, are particles deposited on a foil substrate to prepare the current collector. This is clear from the description in Col. 3, lines 1 to 17, the description of the preparation of the current collector substrate in Experiment 1, Col. 6, lines 30-50, and claim 5 which show that the current collector comprises the metal particles.

On the other hand, the active material of the electrode of Fujimoto is a thin film that is deposited on the current collector by methods such as CVD, sputtering, vapor evaporation and the like. (Refer to Col. 3, lines 28-34, of Fujimoto).

Also discussed in the interview was whether the Examiner was taking the position in the Action (at least with respect to claim 1 of the present application) that the recitation of sintering an anode mix layer on the surface of a metal foil current collector is a process limitation that is not entitled to weight or whether the Examiner was taking the position in the Action that the sintered active material layer of the electrode of the present invention would not distinguish over the thin film layer disclosed in Fujimoto. Ms. Martin confirmed during the interview that she believes that "obtained by sintering" recited in claim 1 is a product-by-process limitation that is not entitled to patentable weight.

Applicants respectfully submit that "sintering" limits the structure of the negative electrode of the present invention and should be given patentable weight. As noted in MPEP 2113:

"The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product. See, e.g., *In re Garnero*, 412 F.2d 276, 279, 162 USPQ 221, 223 (CCPA 1979) (holding "interbonded by interfusion" to limit structure of the claimed composite and noting that terms such as "welded," "intermixed," "ground in place," "press fitted," and "etched" are capable of construction as structural limitations.)"

The step of sintering recited in the present claims is akin to "welded," "intermixed," "ground in place," "press fitted," and "etched" as identified in *Garnero* because it affects the structure of the final product, i.e., it is capable of construction as a structural limitation. The Examiner is respectfully referred to the data of Experiment 3 on pages 26 and 27 of the specification of the present application. The data show that batteries A1 and A5 in which the negative electrode was subjected to sintering have improved cycle life as compared to battery B2 in which the negative electrode was not subjected to sintering, i.e., heat treatment. The cycle life of batteries A1 and A5 are 100 and 60, respectively, while the cycle life of battery B2 is 17. These different results are due to the different structural characteristics imparted to the negative electrodes of batteries A1 and A5 by the sintering treatment.

Therefore, the limitation of "sintering" recited in the claims must be given patentable weight.

Claim 1 has been amended to correct minor errors and claim 3 has been rewritten in independent form. The penetration of particles of active material into the spaces defined by the recurved side face portions of the projections of the current collector of the negative electrode as recited in claim 3 prevents

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the anode mix layer from separating from the current collector, resulting in further improved cycle performance characteristics (see page 5, lines 1 to 3, of the specification of the present application).

For the above reasons, removal of the 35 U.S.C. 103(a) rejection of the claims is believed to be in order and is respectfully requested.

The foregoing is believed to be a complete and proper response to the Office Action dated March 24, 2006, and is believed to place this application in condition for allowance. If, however, minor issues remain that can be resolved by means of a telephone interview, the Examiner is respectfully requested to contact the undersigned attorney at the telephone number indicated below.

In the event that this paper is not considered to be timely filed, applicants hereby petition for an appropriate extension of time. The fee for any such extension may be charged to our Deposit Account No. 111833.

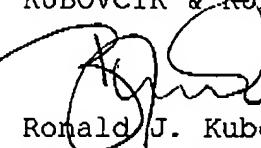
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In the event any additional fees are required, please also  
charge our Deposit Account No. 111833.

Respectfully submitted,

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